

CLAIMS

1. An electronic device testing apparatus for conducting a test by pressing input/output terminals of an electronic device to be tested against a socket of a test head, comprising a pusher provided at least with:
- a pusher base provided to be able to approach and separate with respect to said socket;
 - a lead pusher base fixed to said pusher base;
 - a pusher block provided movably to said pusher base for pressing against said socket by contacting said electronic device to be tested from an opposite face of said socket at the time of said test; and
 - two or more elastic means provided between said lead pusher base and said pusher block having an elastic force in the direction of pressing said electronic device to be tested;
 - and wherein an elastic force from at least one elastic means among said two or more elastic means acts on said pusher block at the time of said test.

2. The electronic device testing apparatus as set forth in claim 1, wherein said pusher block is detachably attached to said pusher.

3. The electronic device testing apparatus as set forth in claim 2, wherein

said pusher further comprises a load base
5 attached with said pusher block;

said load base and said elastic means are provided between said lead pusher base and said pusher base;

a part of said pusher block penetrates said
10 load base and contacts at least one of said elastic means; and

said pusher block is detachably attached to said load base via an opening portion formed on said pusher base.

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4. The electronic device testing apparatus as set forth in claim 3, wherein said elastic means of said pusher comprise springs having mutually different diameters, and said springs are arranged coaxially about
20 said load base.

5. The electronic device testing apparatus as set forth in any one of claims 1 to 4, wherein said two or more elastic means of said pusher include elastic
25 means having mutually different elastic forces.

6. The electronic device testing apparatus as set forth in claim 5, wherein said two or more elastic means of said pusher include elastic means having
5 mutually different modulus of elasticity.

7. The electronic device testing apparatus as set forth in claim 5 or 6, wherein said two or more elastic means of said pusher include an elastic means
10 having mutually different basic lengths.

8. The electronic device testing apparatus as set forth in any one of claims 1 to 7, wherein:

said pusher block comprises two or more
15 shafts protruding perpendicularly from an upper surface;
and

said two or more shafts include
one or more shafts arranged so that
each center axis of said one or more shafts coincide with
20 a bottom face of one elastic means among said two or more
elastic means of said pusher; and

rest of the shafts arranged so that
each center axis of said rest of the shafts coincide with
a bottom surfaces of other elastic means among said two
25 or more elastic means.

9. The electronic device testing apparatus as set forth in claim 8, wherein said pusher block includes a plurality of kinds of pusher blocks wherein said two or
5 more shafts have respectively different lengths.

10. The electronic device testing apparatus as set forth in claim 8 or 9, wherein said pusher block includes a plurality of kinds of pusher blocks wherein
10 portions other than said shafts have different lengths in the vertical direction.

11. The electronic device testing apparatus as set forth in any one of claims 8 to 10, wherein said two
15 or more shafts of said pusher block include:

said one or more shafts having a length to contact said one of elastic means of said pusher, and an elastic force of said one of elastic means is given to said pusher block via said one or more shafts; and

20 said rest of the shafts having a length to contact said other elastic means of said pusher, and an elastic force of said other elastic means is given to said pusher block via said rest of the shafts.

25 12. The electronic device testing apparatus as

set forth in any one of claims 8 to 10, wherein said two or more shafts of said pusher block include:

said one or more shafts having a length to contact said one of elastic means of said pusher, and an
5 elastic force of said one of elastic means is given to said pusher block via said one or more shaft; and

said rest of the shafts having a length not to contact said other elastic means of said pusher, and an elastic force of said other elastic means is not given
10 to said pusher block.

13. The electronic device testing apparatus as set forth in any one of claims 3 to 12, wherein:

said lead pusher base of said pusher has an
15 opening portion;

said pusher block is detachably fixed to said load base by a fixing means attached by penetrating said load base; and

said pusher block is attached/detached as a
20 result that said fixing means is fixed/released via the opening portion of said lead pusher base.

14. The electronic device testing apparatus as set forth in claim 13, wherein said fixing means comprise
25 a bolt.

15. The electronic device testing apparatus as set forth in any one of claims 1 to 14, wherein said electronic device to be tested is pressed against said
5 sockets in a state of being loaded on a tray.

16. A match plate detachably provided to a frame member moving with a Z-axis means provided on an electronic device testing apparatus side for pressing a
10 plurality of electronic devices loaded on a tray to be tested against a plurality of sockets to be electrically contacted, comprising a pusher having at least:

a pusher base provided to be able to approach and separate with respect to said sockets;

15 a lead pusher base fixed to said pusher base;

a pusher block provided movably to said pusher base for pressing against said sockets by contacting said electronic device to be tested from an opposite face of said socket at the time of said test;
20 and

two or more elastic means provided between said lead pusher base and said pusher block having an elastic force in the direction of pressing said electronic device to be tested;

25 and wherein an elastic force from at least

one elastic means among said two or more elastic means acts on said pusher block at the time of said test.

17. The match plate as set forth in claim 16,
5 wherein said pusher block is detachably provided to said pusher.

18. The match plate as set forth in claim 17,
wherein:

10 said pusher further comprises a load base attached with said pusher block;

said load base and said elastic means are provided between said lead pusher base and said pusher base;

15 a part of said pusher block penetrates said load base and contacts at least one of said elastic means; and

said pusher block is detachably attached to said load base via an opening portion formed on said
20 pusher base.

19. The match plate as set forth in claim 18,
wherein said respective elastic means of said pusher comprise springs having mutually different diameters, and
25 said springs are arranged coaxially about said load base.

20. The match plate as set forth in any one of claims 16 to 19, wherein said two or more elastic means of said pusher include mutually different elastic forces.

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21. The match plate as set forth in claim 20, wherein said two or more elastic means of said pusher include elastic means having mutually different modulus of elasticity.

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22. The match plate as set forth in claim 20 or 21, wherein said two or more elastic means of said pusher include an elastic means having mutually different basic lengths.

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23. The match plate as set forth in any one of claims 16 to 22, wherein:

said pusher block comprises two or more shafts protruding perpendicularly from an upper surface;

20 and

said two or more shafts include

one or more shafts arranged so that each center axis of said one or more shafts coincide with a bottom face of one elastic means among said two or more elastic means of said pusher; and

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rest of the shafts arranged so that each center axis of said rest of the shafts coincide with a bottom faces of other elastic means among said two or more elastic means.

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24. The match plate as set forth in claim 23, wherein said pusher block includes a plurality of kinds of pusher blocks wherein said two or more shafts have respectively different lengths.

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25. The match plate as set forth in claim 23 or 24, wherein said pusher block includes a plurality of kinds of pusher blocks wherein portions other than said shafts have different lengths in the vertical direction.

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26. The match plate as set forth in any one of claims 23 to 25, wherein said two or more shafts of said pusher block includes:

said one or more shafts having a length to contact said one of elastic means of said pusher, and an elastic force of said one of elastic means is given to said pusher block via said one or more shafts; and

said rest of the shafts having a length to contact said other elastic means of said pusher, and an elastic force of said other elastic means is given to

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said pusher block via said rest of the shafts.

27. The match plate as set forth in any one of claims 23 to 25, wherein said two or more shafts of said
5 pusher block include:

said one or more shafts having a length to contact said one of elastic means of said pusher, and an elastic force of said one of elastic means is given to said pusher block via said one or more shafts; and

10 said rest of the shafts having a length not to contact said other elastic means of said pusher, and an elastic force of said other elastic means is not given to said pusher block.

15 28. The match plate as set forth in any one of claims 18 to 27, wherein:

said lead pusher base of said pusher has an opening portion;

20 said pusher block is detachably fixed to said load base by a fixing means attached by penetrating said load base; and

said pusher block is attached/detached as a result that said fixing means is fixed/released via the opening portion of said lead pusher base.

29. The match plate as set forth in claim 28,
wherein said fixing means comprise a bolt.

30. A pusher for applying a suitable pressing
5 force to an electronic device to be tested at the time of
conducting a test by pressing input/output terminals of
said electronic device to be tested against a socket,
comprising:

a pusher base provided to be able to approach
10 and separate with respect to said socket;

a lead pusher base fixed to said pusher base;

a pusher block provided movably to said
pusher base for pressing against said socket by
contacting said electronic device to be tested from an
15 opposite face of said socket at the time of said test;
and

two or more elastic means provided between
said lead pusher base and said pusher block having an
elastic force in the direction of pressing said
20 electronic device to be tested;

and wherein an elastic force from at least
one elastic means among said two or more elastic means
acts on said pusher block at the time of said test.

25 31. The pusher as set forth in claim 30, wherein

said pusher block is detachably provided to said pusher.

32. The pusher as set forth in claim 31, wherein
a load base attached with said pusher block
5 is further provided;

said load base and said elastic means are
provided between said lead pusher base and said pusher
base;

a part of said pusher block penetrates said
10 load base and contacts at least one of said elastic
means; and

said pusher block is detachably attached to
said load base via an opening portion formed on said
pusher base.

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33. The pusher as set forth in claim 32, wherein
said elastic means comprise springs having mutually
different diameters, and said springs are arranged
coaxially about said load base.

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34. The pusher as set forth in any one of claims
30 to 33, wherein said two or more elastic means include
mutually different elastic forces.

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35. The pusher as set forth in claim 34, wherein

said two or more elastic means include elastic means having mutually different modulus of elasticity.

36. The pusher as set forth in claim 34 or 35,
5 wherein said two or more elastic means include an elastic means having mutually different basic lengths.

37. The pusher as set forth in any one of claims 30 to 36, wherein:

10 said pusher block comprises two or more shafts protruding perpendicularly from an upper surface; and

said two or more shafts include
one or more shafts arranged so that
15 each center axis of said one or more shafts coincide with a bottom surface of one elastic means among said two or more elastic means; and

rest of the shafts arranged so that
each center axis of said rest of the shafts coincide with
20 a bottom surfaces of other elastic means among said two or more elastic means.

38. The pusher as set forth in claim 37, wherein said pusher block includes a plurality of kinds of pusher
25 blocks wherein said two or more shafts have respectively

different lengths.

39. The pusher as set forth in claim 37 or 38,
wherein said pusher block includes a plurality of kinds
5 of pusher blocks wherein portions other than said shafts
have different lengths in the vertical direction.

40. The pusher as set forth in any one of claims
37 to 39, wherein said two or more shafts of said pusher
10 block include:

said one or more shafts having a length to
contact said one of elastic means, and an elastic force
of said one of elastic means is given to said pusher
block via said one or more shafts; and

15 said rest of the shafts having a length to
contact said other elastic means, and an elastic force of
said other elastic means is given to said pusher block
via said rest of the shafts.

20 41. The pusher as set forth in any one of claims
37 to 39, wherein said two or more shafts of said pusher
block include:

said one or more shafts having a length to
contact said one of elastic means, and an elastic force
25 of said one of elastic means is given to said pusher

block via said one or more shafts; and

said rest of the shafts having a length not
to contact said other elastic means, and an elastic force
of said other elastic means is not given to said pusher
5 block.

42. The pusher as set forth in any one of claims
32 to 41, wherein:

said lead pusher base has an opening portion;
10 said pusher block is detachably fixed to said
load base by a fixing means attached by penetrating said
load base; and

said pusher block is attached/detached as a
result that said fixing means is fixed/released via the
15 opening portion of said lead pusher base.

43. The pusher as set forth in claim 42, wherein
said fixing means comprise a bolt.

20 44. A pusher block attached to a pusher for
applying a suitable pressing force to an electronic
device to be tested for pressing against a socket by
contacting said electronic device to be tested from an
opposite side of said socket at the time of conducting a
25 test by pressing input/output terminals of said

electronic device testing apparatus against said socket,
comprising

a shaft protruding perpendicularly from an
upper surface.

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45. A pusher block as set forth in claim 44,
wherein:

said pusher comprises at least a pusher base
provided able to approach and separate with respect to
10 said socket, a lead pusher base fixed to said pusher base,
and two or more elastic means provided between said lead
pusher base and said pusher block having an elastic force
in the direction of pressing said electronic device to be
tested;

15 said pusher block comprises two or more
shafts protruding perpendicularly from an upper surface;
and

said two or more shafts include

one or more shafts arranged so that
20 each center axis of said one or more shafts coincide with
a bottom surface of one elastic means among said two or
more elastic means; and

rest of the shafts arranged so that
each center axis of said rest of the shafts coincide with
25 a bottom surfaces of other elastic means among said two

or more elastic means.

46. The pusher block as set forth in claim 45,
wherein:

5 said pusher further comprises a load base
attached with said pusher block;

 said load base and said elastic means are
provided between said load pusher base and said pusher
base;

10 at least one of said shafts penetrates said
load base and contacts at least one of said elastic
means; and

 said pusher block is detachably attached to
said load base via an opening formed on said pusher base.

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47. The pusher block as set forth in any one of
claims 44 to 46, wherein said pusher block includes a
plurality of kinds of pusher blocks wherein said two or
more shafts have respectively different lengths.

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48. The pusher block as set forth in any one of
claims 44 to 47, wherein said pusher block includes a
plurality of kinds of pusher blocks wherein portions
other than said shafts have different lengths in the
25 vertical direction.

49. The pusher block as set forth in any one of claims 44 to 48, wherein said two or more shafts include:

said one or more shafts having a length to
5 contact said one of elastic means; and

said rest of the shafts having a length to
contact said other elastic means.

50. The pusher block as set forth in any one of
10 claims 44 to 48, wherein said two or more shafts include:

said one or more shafts having a length to
contact said one of elastic means of said pusher; and

said rest of the shafts having a length not
to contact said other elastic means of said pusher.

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51. The pusher block as set forth in any one of claims 46 to 50, wherein:

said lead pusher base of said pusher has an
opening portion;

20 said pusher block is detachably fixed to said
load base by a fixing means attached by penetrating said
load base; and

said pusher block is attached/detached as a
result that said fixing means is fixed/released via the
25 opening portion of said lead pusher base.

52. The pusher block as set forth in claim 51,
wherein said fixing means comprise a bolt.